



Mining

case study

Type A Pinch Valve Ideal for Tough Copper Mining Slurry



Chuquicamata Mine, Codelco, Chile

Copper mining is one of the most difficult slurry-handling applications. When copper is lifted from the ground, it is embedded in a rock that must be broken apart in order for the copper to be extracted. For every small amount of copper that is produced, a large amount of over-burden is left behind. This material forms a thick, weighty and highly abrasive sludge that must be transported from the flotation cells, where the copper is extracted, to a mine tailings disposal area.

The Chuquicamata Mine, the world's largest copper mine located in Codelco, Chile, was experiencing major difficulties with short service lives on the control valves that were being used in this disposal process. As in most applications where thick slurries are being handled, the Chuquicamata Mine's pipelines are oversized to allow for a faster rate of flow. Therefore, an oversized control valve in the pipeline must always be positioned at more than 50 percent closed for proper control accuracy, causing a high pressure drop followed by a severe rate of recovery, which results in damaging cavitation. Furthermore, increased velocity at the valve's throttling point can quickly erode standard metal valve bodies.

The Chuquicamata Mine found the answer in Type A Control Pinch Valves from Red Valve. Each Type A installed at the Chuquicamata Mine is equipped with Red Valve's patented cone sleeve, a sleeve designed to reduce pressure across the downstream side of the valve

and maintain a low recovery factor, eliminating cavitation. Like all Red Valve pinch sleeves, the cone sleeve is constructed entirely of abrasion-resistant elastomer and is the only wetted part of the valve. The sleeve will outwear any valve on the market and is easy and inexpensive to replace. The area where velocity increases is strengthened with extra material, which further protects against the destructive abrasiveness of the copper mine tailings.

Pleased with the results, the Chuquicamata Mine later opted to install the Type A on its water reclamation system. Before the slurry is discharged to the disposal tank, it is sent to a thickener that extracts the water for reuse. The sludge being pumped through the pipelines after the water has been extracted is highly solidified and even more abrasive than before. It is important that the valves in these tough conditions are extremely reliable so that water, a limited and expensive resource for mining companies, can be efficiently reclaimed.



Type A in operation on water reclamation system

To further reduce pressure recovery and cavitation in its water reclamation pipelines, the Chuquicamata Mine installed a Red Valve TF-O Variable Orifice Flow Restrictor downstream of each Type A Control Valve. The TF-O decreases pressure in the line, forcing backpressure onto the discharge opening of the control valve. This backpressure offers added protection against cavitation and valve wearing.



The TF-O Flow Restrictor is installed downstream of the Type A